DOCKET: 70-0157

LICENSEE: University of Texas at Austin
Austin, TX

SUBJECT: LICENSE AMENDMENT REQUEST SUPPORTING SHIPPING PREPARATIONS AND AMENDMENT ONE OF SNM-180 (ENTERPRISE PROJECT IDENTIFICATION L-2019-LLA-0099)

BACKGROUND

By letter dated April 22, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19119A008), the Nuclear Engineering Teaching Laboratory (NETL) of the University of Texas at Austin submitted a license amendment request (LAR) in support of shipping preparations of licensed material currently in storage. The special nuclear materials (SNM) consist of 17 fuel elements, described as the Manhattan College Zero Power Reactor (MCZPR) fuel, and the subcritical assembly, constructed of 8 disks of polyethylene loaded with dispersed UO_2 (Uranium Dioxide), with an enrichment of 19.776 percent. The LAR requests permission to remove these materials from storage and prepare them for shipment to the Department of Energy (DOE). These materials have only been approved for storage since receipt in 2004.

REGULATORY REQUIREMENT

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 70.61(d) requires, in part, that the risk of nuclear criticality accidents be limited by assuring that under normal and credible abnormal conditions, all nuclear processes are subcritical, including use of an approved margin of subcriticality for safety.

Regulations in 10 CFR 70.24 require, in part, that certain licensees authorized to possess special nuclear material maintain a criticality accident alarm system capable of detecting an absorbed dose in soft tissue of 20 rads (combined neutron and gamma radiation) at an unshielded distance of 2 meters within one minute for all areas in which licensed SNM is handled, used, or stored. Such areas must be covered by two detectors.

DISCUSSION

The NETL initially requested acquisition of these materials in a non-publicly available LAR dated May 3, 2004. This was approved by Amendment 1 on July 28, 2004. Following receipt, the materials remained in the shipping containers. The materials were approved to be removed from the shipping containers and moved to secure storage by Amendment 2 dated April 22, 2005 (ADAMS Accession Nos.: ML072630606, ML072630617). At the time of receipt in 2004, the intent was support to research developing accelerator and source driven subcritical assemblies. This research never materialized, and the material has never been requested to be removed from storage. Continued storage was requested and approved in the last renewal in November 2009 (ADAMS Accession Nos.: ML093030048, ML093030057). The SNM-180 license has the following materials identified on the license:

Table 1

Material	Physical/Chemical Form	Quantity, grams (g)
Uranium enriched to less than 20% in U-235	Uranium Dioxide in high density polyethylene	[redacted] g U-235
Plutonium	Sealed Plutonium-Beryllium (PuBe) neutron sources	[redacted] g
Uranium enriched to less than 20% in U-235	Uranium Silicide in Aluminum Matrix	[redacted] g U-235

The LAR (ADAMS Accession No. ML19119A008) states the NETL intent is to terminate the SNM-180 license. To that end, on February 27, 2019, the NETL submitted a non-publicly available LAR on the research reactor docket (Docket 0500-0602) to transfer the Plutonium-Beryllium (PuBe) source in Table 1 to the Research Reactor License (R-129). This source is routinely used in the calibration of the Criticality Accident Alarm System (CAAS). This LAR was approved on September 5, 2019 (ADAMS Accession No. ML19065A197).

The LAR (ADAMS Accession No. ML19119A008) requests authority to remove these materials from storage and prepare them for shipment. When these materials were received in 2004, they were shipped in Type 6M shipping packages. The Type 6M does not conform to the U.S. Nuclear Regulatory Commission (NRC) requirements for Type B packages. The Type 6M container is non-performance based and the Department of Energy (DOE) decided to phase out the use of the 6M for type B shipments in January 2006. The NETL has conferred with the DOE, who will package and ship these materials upon amendment approval. The shipping package of choice for these type materials is the ES-3100 and the certificate of compliance was issued May 8, 2009 (ADAMS Accession No. ML091310143). The dimensions of the materials to be shipped require limited modification of the materials to be placed in ES-3100 shipping containers. The NETL provided detailed procedures on August 16, 2019 for the modification of these materials (ADAMS Accession No. ML19240A024). The section below provides a review of Nuclear Criticality Safety (NCS) for the handling, modification, and shipping of the materials.

Licensee Submittal

The MCZPR fuel consists of 17 elements, each consisting of six concentric cylinders formed by 18 curved fuel plates. Fuel plates consist of a 0.02-inch-thick U_3Si_2-Al fuel containing a nominal enrichment of 19.75% ^{235}U and nominal mass of 235 grams ^{235}U. The cladding material of each fuel plate consists of a 0.015-inch 6061T aluminum alloy. The full nominal thickness of each fuel plate is 0.05-inches. The inner diameter of the cylindrical element is approximately 1.25 inches with a coolant channel of 0.118 inches. The length of each fuel element is 37 inches. To fit inside the ES-3100 package, NETL proposed shortening the length of each fuel element from 37 to approximately 28 inches by removing part of the aluminum outer enclosure tube both above and below the fuel region. The fuel, itself, would remain undisturbed.

The MCZPR fuel is currently stored in secured storage racks designed to maintain subcriticality under all normal and credible abnormal conditions, including varying degrees of interspersed moderation. To facilitate the physical modification of the elements, NETL proposed that the elements be removed from the storage rack in accordance with NETL procedures which require no more than two fuel elements to be outside of the storage rack at any given time (ADAMS Accession No. ML19240A024). Following the physical modification of each individual element, it will either be transferred directly to DOE personnel for loading into the ES-3100 package, or it will be returned to the secured storage rack until time of loading.

The subcritical assembly consists of a main core consisting of eight polyethylene disks loaded with dispersed UO_2 of a 19.776% ^{235}U nominal enrichment, stacked and wrapped in a polyethylene jacket. Thirty-six fuel pellets consisting of the same material as the disks contained in the main core are also present. The aggregate quantity of ^{235}U in the subcritical assembly core requires the use of a Type B package; however, the assembly is too large to fit into any currently available Type B packages. As such, NETL proposed removing the polyethylene jacket and separating the eight fuel disks, allowing some of the disks (fuel loading varies disk to disk) to be shipped in Type A packages. Fuel disks not able to be shipped in Type A packages once separated would be cut to fit into a Type B package or to a size which limits ^{235}U mass to a value below the limit for a Type A package. The thirty-six fuel pellets would be shipped in either a Type A or Type B package. As with the MCZPR fuel, fuel disks will either be transferred directly to DOE personnel for loading or will be returned to secure storage until time of loading following physical modification.

Staff Review and Analysis

<u>MCZPR Fuel</u>

The MCZPR fuel is currently stored in a secured storage rack designed to maintain subcriticality under all normal and credible abnormal conditions, including varying degrees of interspersed moderation. In non-publicly available LARs dated November 10, 2004 and January 25, 2005, NETL provided a safety analysis and supplemental information for the movement of the MCZPR fuel from its shipping containers (6M type drums) to the storage rack and its subsequent storage. In these letters, NETL provided an argument that discussed the unlikelihood of water/moderation conditions in the location of the MCZPR fuel storage rack, a condition that would be required before criticality is possible. Based on the unlikelihood of water moderation/reflection conditions, NETL asserted that there was no credible risk associated with the storage of the MCZPR elements in the storage rack. In a letter dated April 22, 2005, NRC staff documented the safety evaluation of NETL's original license amendment request to move the MCZPR fuel from its shipping containers (6M type drums) to the storage rack (ADAMS Accession No. ML072630617). NRC staff concluded that the physical configuration of the storage rack, a 1x9x2 array (a 1x9 array stacked on top of a 1x9 array), was adequately subcritical under conditions of worst-case interspersed moderation and full reflection (k_{eff} = 0.72842). NRC staff noted that the actual k_{eff} under these conditions would be less than that calculated due to both the aluminum extensions on either end of the fuel elements increasing the vertical separation of the fuel contained within the elements and the storage racks increasing the horizontal separation of the elements. No credit was taken for the structural supports or the extensions in NETL's calculations. In addition to these calculations, NRC staff noted that there are no probable means for water moderation to be introduced into the location where the fuel is stored. There is no sprinkler or fire suppression system in the storage location as fire protection is provided by restrictions on the storage of flammable materials inside the room. In the event of a fire, a portable carbon dioxide fire extinguisher is used. NRC staff also noted that there are no service lines or services containing water in storage location, the door to the room is not water tight and has louvers that would prevent the water depth in the room from exceeding 18 inches, and it is approximately 15 feet above the floor to the reactor building minimizing the likelihood that storage location would experience flooding. Ultimately, NRC staff concluded that storage of the MCZPR fuel elements in the storage rack (a 1x9x2 array) would provide reasonable assurance that a criticality accident would not occur.

During a site visit on June 25, 2019, NRC staff discussed the continued validity to NETL's previous safety analysis. NRC staff performed a review of the previous safety analyses (non-publicly available LARs dated November 10, 2004 and January 25, 2005) to assess its boundaries with respect to NETL's proposed activities. NRC staff determined that the basis for the NRC staff's previous conclusions remained valid in that the unlikelihood of introducing full water moderation/reflection conditions continued to provide reasonable assurance that a criticality accident would not occur. This conclusion also applied to NETL's proposed activities involving the MCZPR fuel handling outside of the storage rack, including its physical modification in the sorting hood, as the unlikelihood of introducing water moderation/reflection conditions during these activities (in addition to other factors discussed below) would provide reasonable assurance that a criticality would not occur. However, because an integral part of the NRC staff's previous conclusions was the margin (both subcritical margin and safety margin) associated with the fact that the MCZPR fuel remained subcritical under the unlikely event of full flooding (ADAMS Accession No. ML072630617), and because the margin associated with NETL's proposed activities involving the handling and modification of the fuel elements outside of the storage rack had not been assessed, NRC staff performed an independent confirmatory analysis to assess the margin associated with NETL's proposed activities.

It should be noted that the NRC staff's conclusions were based on the unlikelihood of moderation/reflection conditions sufficient to pose a criticality concern. The purpose of the independent analysis performed was to assess the margin associated with NETL's proposed activities as the margin associated with the MCZPR fuel outside of the storage rack has not previously been assessed. The NRC staff focused their analysis for NETL's proposed activities on: (1) physically modified fuel within the storage rack, (2) fuel elements located outside of the storage rack, and (3) the proposed cutting operation. Bounding conditions specifically considered included:

- All 17 physically modified fuel elements located inside the storage rack under optimum interspersed moderation and reflection conditions (Configuration One)
- All 17 physically modified fuel elements located inside the storage rack with four TRIGA elements nearby (Configuration Two)
- All fuel elements removed from the storage rack and stacked together into a worst-case geometry under optimum interspersed moderation and reflection conditions (Configuration Three)
- Uranium-bearing shavings amassed in the sorting hood and/or its associated ventilation system under optimum interspersed moderation and reflection conditions (Configuration Four)

It should be noted that the ES-3100 Certificate of Compliance (CoC) is issued to the DOE. The criticality safety requirements for the loading of the ES-3100 are dictated by the conditions of the ES-3100 CoC, Certificate No. 9315. Because the DOE is responsible for the loading and shipment of the ES-3100, the criticality hazards associated with the potential misloading of the MCZPR fuel into the ES-3100 package is outside of the scope of this safety evaluation. However, the conservative analysis performed in this safety evaluation (namely for Configuration Three) considerably bounds any potential criticality hazards associated with ES-3100 package loading.

Independent NRC staff analysis was performed using a SCALE/KENOVI: CSAS6 3D Eigenvalue Monte Carlo application with the continuous energy ENDF/B-VII.1 cross section library. No specific penalty was assigned to account for code bias and its associated uncertainty; however, an upper subcritical limit of 0.95 was applied to bound bias and bias uncertainty as well as any additional unquantified (or unqualified) uncertainties beyond that already explicitly bound by the code bias. A conservative multiplier of 2 was applied to the uncertainty associated with the calculated results from SCALE/KENOVI.

The fuel elements were approximated by six concentric cylinders with a total active fuel region of 24 inches. The total length of each fuel element was conservatively assumed to be 24 inches, neglecting the additional inactive region of each element to minimize end-to-end vertical separation and maximum neutronic interaction. The fuel loading for each cylinder (of each element) was analyzed using the information provided by NETL in the letter dated November 10, 2004:

Cylinder No.	Fuel Loading (^{235}U grams)	Inner Diameter (cm)	Outer Diameter (cm)
1	[redacted]	3.2	3.454
2	[redacted]	4.064	4.318
3	[redacted]	4.928	5.182
4	[redacted]	5.791	6.045
5	[redacted]	6.655	6.909
6	[redacted]	7.518	7.772

Each element was assumed to have a total fuel loading of 235 grams ^{235}U. Enrichment was assumed to be 19.75% ^{235}U. The composition of the fuel was assumed to be a uranium silicide-aluminum dispersion (U_3Si_2-Al). The 0.015-in 6061T aluminum alloy cladding was conservatively replaced by a spatially-uniform distribution of U_3Si_2-Al. A coolant channel of 0.118 inches was assumed consistent with the fuel design.

Modified Elements in Storage Rack – Configuration One

The original analysis of the storage rack was for the MCZPR fuel elements unmodified. NRC staff reviewed the original analyses to determine the potential impact to margin by storing modified MCZPR fuel elements. The original analysis took no credit for the vertical spacing, noting that the actual k_{eff} under these conditions would be less than that calculated due to both the aluminum extensions on either end of the fuel elements increasing the vertical separation of the fuel contained within the elements. Because the original analysis did not take credit for the vertical separation of the fuel, any reduction in the vertical separation should not have a significant impact on reactivity. Nevertheless, NRC staff performed a new analysis to assess the impact to subcritical margin and reconfirm the NRC staff's previous conclusions. The NRC staff evaluated a configuration involving all 17 modified fuel elements located inside the storage rack. The fuel elements were arranged into a 1x9x2 tightly-packed (both vertically and horizontally) array with full-density light water interspersed moderation. An 18th fuel element was added, as was in the original analysis, for symmetry and simplification of calculations. The array was positioned with the bottom and backside directly against Oak Ridge (OR) concrete (density of 2.2994 grams per cubic centimeter), with 12 inches of full-density light water reflection on all remaining sides. No credit was taken for the horizontal spacing between fuel elements provided by the storage rack.

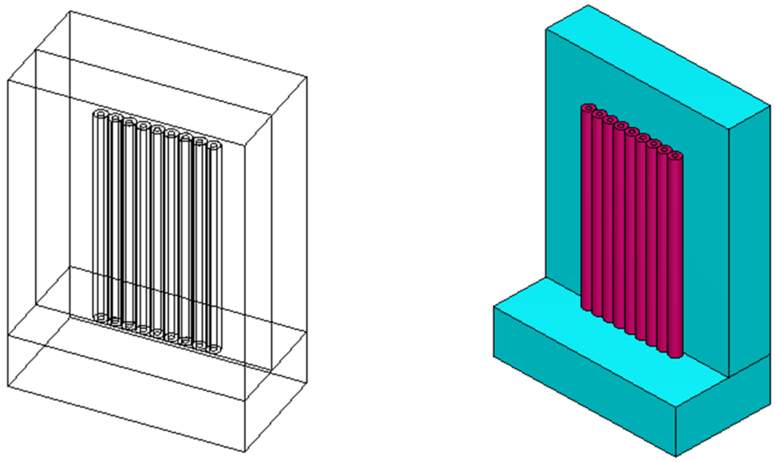

Figure 1. MCZPR fuel elements (18) located in the storage rack (with water reflector/moderator removed) against concrete back and bottom. Note that there are 18 fuel elements present (1x9x2) but appear as 9 due to an intended lack of vertical spacing.

Results of the NRC staff's analysis determined that there was no significant impact to subcritical margin or safety margin, confirmed the NRC staff's previous conclusions (ADAMS Accession No. ML072630617), and demonstrated that the modified MCZPR fuel elements remained adequately subcritical in the unlikely event of full flooding ($k_{eff} < 0.95$). Therefore, consistent with the NRC staff's previous conclusions, the NRC staff concluded that reasonable assurance is provided for the subcriticality of physically modified MCZPR fuel elements stored in the storage rack (a 1x9x2 array).

Modified Elements in Storage Rack – Configuration Two

The original analysis of the storage rack (non-publicly available LARs dated November 10, 2004 and January 25, 2005) included a configuration similar to Configuration One, but with four TRIGA elements placed adjacent to the storage rack to evaluate the effects of other nearby interacting units of fissionable material. Because the impacts to subcritical margin are limited to the issue of vertical spacing, an issue determined in Configuration One to have no meaningful impact, NRC staff determined that this configuration was bound by the original analysis and NRC staff conclusions (ADAMS Accession No. ML072630617). Therefore, the NRC staff concluded that reasonable assurance is provided for the subcriticality of physically modified MCZPR fuel elements stored in the storage rack (a 1x9x2 array) with respect to interaction with nearby fissionable material.

Elements Outside of Storage Rack – Configuration Three

NRC staff evaluated a configuration involving all 17 of the modified fuel elements located outside of the storage rack. The fuel elements were placed into varying arrangements to determine the most reactive geometrical configuration. For all cases, the fuel elements were arranged into a tightly-packed (both horizontally and vertically) array under optimum interspersed moderation conditions, with the bottom (long-side of elements) and one side (long-side of elements) directly against OR concrete and 12 inches of full-density light water reflection on all remaining sides. The configurations specifically considered included:

- A 4x4 array with one element centered on top of the array (17 elements)

- A pyramid consisting of five levels, with levels 1 through 5 containing 6, 5, 4, and 2 elements, respectively (17 elements)

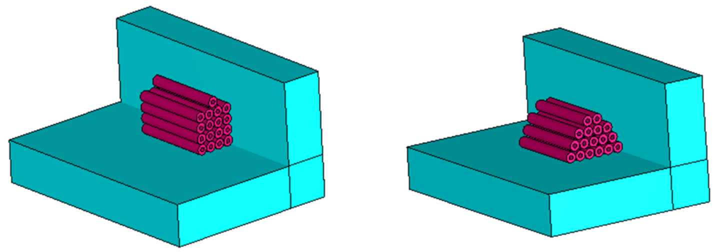

Figure 2. MCZPR fuel elements (17) stacked into 4x4 cuboid and pyramid configurations outside of the storage rack (with water removed).

Results of the NRC staff's analysis determined that a configuration involving all 17 fuel elements arranged into a 4x4 array (with one element centered on top of the array) was the most reactive geometrical configuration (likely due to the high surface area-to-volume ratio of a cuboid) and exceeded the $k_{eff} < 0.95$ criterion. As such, NRC staff performed further calculations to determine how many fuel elements could be stored in a cuboid geometry (under the same moderation and reflection conditions) before posing a criticality concern.

The further analysis performed by NRC staff determined that several (> 7) MCZPR fuel elements would be required before posing a criticality concern. As previously stated, governing NETL procedures require that no more than two fuel elements be outside of the storage rack at any given time (ADAMS Accession No. ML19240A024). Therefore, to achieve a configuration involving several fuel elements stacked outside of the storage rack in an unsafe geometry, multiple administrative failures of qualified NETL staff would have to occur. Notwithstanding a concerted act, NETL staff would not have any reason or motive to violate NETL procedures in such an egregious manner. Additionally, the multiple failures would have to go unnoticed by other NETL staff for some duration, concurrent with full flooding of the area in which the fuel was located.

As previously stated, the NRC staff's conclusions that NETL's proposed activities provide reasonable assurance that a criticality will not occur is primarily based on the unlikelihood of moderation/reflection conditions sufficient for criticality. The purpose of this analysis was to assess the potential impacts to margin (both safety margin and subcritical margin) in the unlikely event that worst-case moderation/reflection conditions were to occur. In this case, subcritical margin was significantly impacted due to the difference in geometrical configuration from that of the storage rack. However, due to the many unlikely events or errors (for which there is no reason or motive), additional margin in safety is provided despite the impact to subcritical margin, and the impact to subcritical margin only occurs once safety margin is degraded. NRC staff concluded that the impact to margin for this case is acceptable and reasonable assurance is provided for the subcriticality of any upset involving the stacking of MCZPR fuel elements outside of the storage rack.

Mass Accumulation in the Sorting Hood or its Associated Ventilation System – Configuration Four

NRC staff evaluated a configuration involving fissionable mass accumulation in the sorting hood due to inadvertent cutting through the fissile region of the MCZPR fuel elements and/or fissile material from the cutting of the subcritical assembly fuel. The material composition was assumed to be 19.75 percent enriched uranium metal homogeneously mixed with full-density light water in the shape of a sphere. Uranium metal was selected as the material composition for this evaluation to bound both the fuel from the subcritical assembly (UO_2) and the MCZPR fuel (U_3Si_2-Al) as uranium metal is a more reactive material composition than both. A spherical geometry was selected for this evaluation as it is, in general, the most reactive shape due to its high surface area-to-volume ratio, and therefore bounds all possible geometric configurations. The sphere was evaluated under optimum interstitial moderation conditions with 12 inches of tight-fitting reflection (both full-density light water).

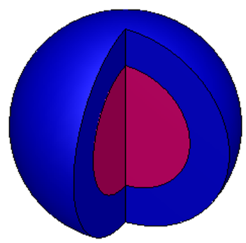

Figure 3. Optimally interstitially-moderated uranium metal sphere (u metal and water mixture) with 12 inches of full-density light water reflection (front-right quarter removed).

Results of the NRC staff's analysis determined that more than a kilogram of ^{235}U would be required before presenting a criticality concern. This equates to more than 5 kilograms U, 5.6 kilograms UO_2, or 16 kilograms U_3Si_2. Given that the nominal loading of each MCZPR fuel element is 235 grams ^{235}U and, despite varying from disk-to-disk, is also far below a kilogram for any individual subcritical assembly fuel disk, it is extremely unlikely that such a large mass could accumulate without being noticed. Governing NETL procedures (ADAMS Accession No. ML19240A024) require an initial measurement and marking, as well as a peer overcheck of the measurement and marking, prior to cutting. This initial measurement and marking along with a peer overcheck significantly reduces the likelihood that inadvertent cutting through the fuel region of the MCZPR fuel elements would occur in the first place. The NETL procedures require a complete work stoppage of the cutting operation in the event that the fuel region is inadvertently cut. Furthermore, full flooding of the sorting hood and/or its associated ventilation system would have to occur concurrently with the mass accumulation before criticality is possible. The NRC staff also notes that the actual minimum critical mass for such an accident sequence would be much higher as there are a large number of conservatisms built into the calculations, particularly with respect to material composition, geometry, and interstitial moderation.

As previously stated, the NRC staff's conclusions that NETL's proposed activities provide reasonable assurance that a criticality will not occur is primarily based on the unlikelihood of moderation/reflection conditions sufficient for criticality. The purpose of this analysis was to assess the potential impacts to margin (both subcritical margin and safety margin) in the unlikely event that worst-case moderation/reflection conditions were to occur. In this case, significant safety margin is provided as it is extremely unlikely that sufficient mass for criticality would be present given that many required unlikely events or errors (for which there is no reason or motive). Therefore, the NRC staff concluded that reasonable assurance is provided for the subcriticality of any upset involving an accumulation of fissionable material in the sorting hood and/or its associated ventilation system.

Subcritical Assembly

The subcritical assembly does not represent a criticality concern, and the act of removing the polyethylene jacket and subsequently separating the eight fuel disks only decreases reactivity. However, because several of the fuel disks will need to be physically modified to facilitate loading into shipping packages, the potential for fissionable material accumulation in the sorting hood and/or interaction with any MCZPR fuel inadvertently removed during the cutting operation exists. This is bound by the NRC staff's evaluation of Configuration Four (discussed above).

Criticality Accident Alarm System

As stated in NETL's letter dated April 22, 2019 (ADAMS Accession No. ML19116A008), the location in which the MCZPR fuel is store is monitored in accordance with 10 CFR 70.24. NETL's criticality accident alarm system consists of two separate radiation detection systems, both capable of detecting an absorbed dose in soft tissue of 20 rads combined neutron and gamma radiation at an unshielded distance of two meters within one minute. The location in which the fuel is store contains a Ludlum Model 375 dual gamma and neutron monitor with local and remote alarms, and ambient radiation is measured in adjacent areas with multiple Ludlum Model 375 gamma and neutron area radiation monitors with local and remote alarms that report to the reactor control room. The locations of the MCZPR fuel storage rack, the sorting hood where the cutting operation is planned to take place, and the area in which loading operations are planned are all within the coverage area for at least two independent detectors. Therefore, NRC staff concludes that the licensee's request meets the requirements of 10 CFR 70.24 and is acceptable.

Evaluation Findings

The staff reviewed NETL's request together with supplemental information provided by the licensee. Based on the review discussed in this report, the staff concludes that the licensee's request provides reasonable assurance of subcriticality under normal and credible abnormal conditions and satisfies the requirements of 10 CFR Part 70. Therefore, the staff recommends that this license amendment request be approved.

Upon completion of the required material adjustments and shipping preparations, the materials will be returned to secured storage, either in the designated storage racks of the first level storage area of room [redacted] or within the shipping container. In both cases, the tamper-indicating seals are in place. As a result of the approval of this amendment, the following changes have been made to the license:

1) LC 6B: The attached licenses indicate LC 6B as "deleted," reflecting the approval of Amendment 7 to the R-129 license, transferring the PuBe from the SNM-180 license.

2) LC 9: Condition 9 has been modified to reflect the LAR submittal of April 22, 2019 and the supplemental August 16, 2019 procedures.

3) LC 10: Condition 10 describes the authorized place of use:

a. LC10A has been modified from “Used at NETL” to “Storage and shipment only.”
b. LC10B has been modified from “Used at NETL” to “Transferred to R-129.”
c. LC10C has been modified from “Used at NETL” to “Storage and shipment only.”

4) LC 15: In response to the events of September 11, 2001, Enforcement Action (EA)-05-090 was issued (ADAMS Accession No. ML053550170) on December 22, 2005, requiring compliance with “Increased Controls” orders regarding the possession of radioactive materials quantities of concern. This condition was written into the SNM-180 license as LC 15 during renewal in 2009. On March 19, 2013, the Nuclear Regulatory Commission (USNRC) published Title 10 of the *Code of Federal Regulations* (10 CFR) Part 37, “Physical Protection of Category I and Category 2 Quantities of Radioactive Material.” As of March 19, 2014, licensees were required to be in compliance with this rule (ADAMS Accession No. ML14073A493) and rescinded the increased controls orders. For compliance, this LC has been marked as “deleted.”

5) LC 16: Has been added for emphasis on the disposition of materials on the SNM-180 with the approval of this amendment and the pending expiration of the license:

   Upon completion of described preparations, the materials will be returned to secure storage until the scheduled shipment. In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Part 70.38 (c)(1) and (2), the license will continue to be in effect with respect to possession of Special Nuclear Material (SNM). The licensee will: (1) limit actions involving special nuclear material decontamination and decommissioning, and (2) continue to control entry to restricted areas until they are suitable for release in accordance with NRC requirements, as well as the stipulations in 10 CFR 70.38(k).

Environmental Review

The staff has determined that the FNMCP changes are related to safeguards matters, which are categorically excluded from the requirements to prepare a site-specific environmental assessment. Therefore, in accordance with 10 CFR 51.22(c)(12), neither an environmental assessment nor an environmental impact statement is warranted for this action.

Regarding the administrative amendments to the GNF-A license submitted on October 8, 2015, according to 10 CFR 51.22(c)(11), the issuance of amendments to licenses for fuel cycle plants which are administrative, organizational, or procedural in nature—or which result in a change in process operations or equipment—are eligible for categorical exclusion provided that:

i. There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.
ii. There is no significant increase in individual or cumulative occupational radiation exposure.
iii. There is no significant construction impact.
iv. There is no significant increase in the potential for or consequences from radiological accidents.

The changes in this amendment do not affect the scope or nature of the licensed activity and will not result in a significant change in the types or amounts of effluents released offsite. There will not be any significant increase in individual or cumulative occupational radiation exposure, and there will not be any significant increase in the potential or consequences from radiological accidents. There is no construction associated with these changes, so there will not be any impact from construction.

Conclusion

The NRC staff reviewed the licensee's amendment request as submitted on April 22, 2019, and supplemented by the August 16, 2019 procedures. The NRC staff concludes that the information and regulatory commitments provided by the NETL in their license application provide reasonable assurance of adequate safety for removal of the specified materials from storage and preparation for shipment will not have an adverse impact on the public health and safety, the common defense and security, or the environment; and meet the applicable requirements in 10 CFR Parts 19, 20, 36, 51, 70, 73, and 74.

Recommendation

The LAR requests to remove licensed materials from storage to be prepared for shipment to DOE with a stated goal to terminate the SNM-180 license. The NRC staff recommends that the amendment request for removal from storage and preparation for shipment be approved. This approved amendment is issued in support of shipping preparation and does not authorize any other use of SNM on the license. Upon completion of described preparations, the materials will be returned to secure storage until packaging and shipment, both performed by the DOE.

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